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# Teacher-Child Relationships and Behavioral Adjustment: Transactional Links for Preschool Boys at Risk

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**Abstract**

In this short-term longitudinal study, transactional links between teacher–child relationships and behavioral adjustment were investigated in a sample of preschool boys ($N$ = 175) at risk for developing externalizing problems. Teachers ($N$ = 175) reported about the quality of the teacher–child relationship (i.e., Closeness, Conflict, and Dependency) and about children's behavioral adjustment (i.e., Externalizing Behavior, Internalizing Behavior, and Prosocial Behavior) at three occasions within one school year. Cross-lagged path-analytic models showed positive bidirectional associations between Conflict and both Externalizing and Internalizing Behavior from Time 1 to Time 2, but not from Time 2 to Time 3. In addition, there was a transactional sequence with more Conflict at Time 1 leading to less Prosocial Behavior at Time 2 which, in turn, predicted more Conflict at Time 3. Closeness was reciprocally and positively related to Prosocial Behavior over time, and was positively and unidirectionally predicted by Internalizing Behavior. Dependency showed positive reciprocal links with Internalizing Behavior over time, and negatively and unidirectionally predicted Prosocial Behavior. These findings suggest that interventions may be most effective if they adjust their focus and strategy depending on children's specific behavioral and relational needs.

Keywords: teacher–child relationships, externalizing behavior, internalizing behavior, prosocial behavior, cross-lagged models

# Teacher-Child Relationships and Behavioral Adjustment: Transactional Links for Preschool Boys at Risk

Previous research has shown that the affective quality of teacher–child relationships affects children's behavioral adjustment (e.g., Buyse, Verschueren, Verachtert, & Van Damme, 2009; Graves & Howes, 2011; Henricsson & Rydell, 2006; Myers & Morris, 2009). On the other hand, children's problem behaviors are also found to predict the quality of the teacher–child relationship (e.g., Buyse, Verschueren, Doumen, Van Damme, & Maes, 2008; Henricsson & Rydell, 2004; Jerome, Hamre, & Pianta, 2009; Rudasill, 2011). Most research has investigated the teacher–child relationship as either a predictor or an outcome of children's behavioral adjustment. Far less is known about reciprocal links between teacher–child relationships and behavioral functioning over time. The few studies that did examine bidirectional influences focused on one or two dimensions of the relationship (e.g., closeness and conflict) and behavioral adjustment (e.g., externalizing and internalizing behavior; Zhang & Sun, 2011). In the present study, we looked at three dimensions of both the teacher–child relationship (i.e., closeness, conflict, and dependency) and children's behavioral adjustment (i.e., externalizing behavior, internalizing behavior, and prosocial behavior). In addition, previous studies used community samples (i.e., samples that were not selected on the basis of special criteria, such as child characteristics or problem behaviors). In the present study, we investigated bidirectional influences between teacher–child relationship quality and children's behavioral adjustment in a sample of preschool boys who are at risk for developing externalizing problems.

In the following sections, we will review the literature about the predictive role of teacher–child relationships for children's behavioral adjustment and of children's problem behaviors for teacher–child relationship quality. This overview contains studies with children

from preschool to sixth grade. As we are interested in associations over time, we will focus on longitudinal studies here, although occasionally cross-sectional studies are also mentioned. Some studies examined associations over different school years, whereas other studies performed two or more data collections within one school year. The present study will investigate associations between teacher–child relationships and behavioral adjustment at three time points within one school year.

**Teacher–child Relationships as Predictors of Children's Behavioral Adjustment**

Research about the impact of the teacher–child relationship on young children's school functioning has often been based on an extended attachment perspective, which originates from research about parent–child relationships (Bowlby, 1969). According to this perspective, sensitive teachers, just as parents, can serve as a secure base for children from which they can explore the school environment and which will enhance their social, emotional, and cognitive development (Davis, 2003; Pianta, 1999; Pianta, Nimetz, & Bennett, 1997). During the last two decades, research has shown strong support for the association between teacher–child relationships and several aspects of children's school adjustment, such as behavioral adjustment, school engagement, and academic achievement (e.g., Buyse et al., 2009; Roorda, Koomen, Spilt, & Oort, 2011; Silver, Measelle, Armstrong, & Essex, 2005).

Studies based on an extended attachment perspective often distinguish between three dimensions of the teacher–child relationship: closeness, conflict, and dependency. Closeness refers to the degree of warmth and open communication in the relationship. Conflict reflects discordant and coercive interactions and dependency refers to overly dependent and clingy behaviors of the child (Pianta, 2001). Previous research has found that these three dimensions of the teacher–child relationship act as predictors for children's behavioral adjustment. Most

research has focused on the conflict and closeness dimensions of the relationship, whereas dependency has received less attention in previous research. In addition, research on behavioral adjustment has pointed to three types of behavior: externalizing behavior, internalizing behavior, and prosocial behavior. Externalizing behavior refers to undercontrolled and outwardly directed behavior that is usually annoying and disruptive for others, such as hyperactivity and aggression (Merrell, 1999; see also Cicchetti & Toth, 1991). Internalizing behavior reflects overcontrolled and inwardly directed behavior that represents problems with the self and frequently involves behavioral deficits and patterns of social avoidance, such as anxious and withdrawn behavior (Merrell, 1999; see also Cicchetti & Toth, 1991). Prosocial behavior refers to voluntary behaviors that are intended to benefit others, such as helping and sharing (Eisenberg, Fabes, & Spinrad, 2006). With regard to behavioral adjustment, most attention has been paid to externalizing and internalizing behavior, whereas prosocial behavior has only been scarcely investigated.

Evidence for the association between conflict and externalizing behavior is most consistent. Higher levels of conflict have been shown to predict more externalizing problem behaviors, both within school years (e.g., Myers & Morris, 2009; Ewing & Taylor, 2009) and across school years (e.g., Buyse et al., 2009; Silver et al., 2005). For instance, higher levels of teacher–child conflict in first grade predicted more aggressive behavior in third grade (Buyse et al., 2009). In addition, conflict in the teacher–child relationship has been linked with higher levels of internalizing behavior over time (Myers & Morris, 2009). In other longitudinal studies, however, conflict did not predict children's levels of internalizing behavior (e.g., Henricsson & Rydell, 2006; O'Connor, Collins, & Supplee, 2012). Although research about the predictive value of teacher–child relationships for prosocial behavior is scarce, some evidence has been

found that high levels of conflict are associated with less prosocial behavior from fall to spring of the preschool year (Myers & Morris, 2009).

In contrast to conflict, most longitudinal studies found that closeness did not significantly predict children's levels of externalizing behavior (e.g., Buyse et al., 2009; Ewing & Taylor, 2009). Only a few cross-sectional studies showed significant, negative associations between closeness and externalizing behavior (Baker, 2006; Spilt, Koomen, & Mantzicopoulos, 2010). In addition, some studies provided evidence that closeness negatively affected children's internalizing problems over time (e.g., Myers & Morris, 2009; Pianta & Stuhlman, 2004). For example, Pianta and Stuhlman (2004) found that higher levels of closeness in the preschool teacher–child relationship were associated with less mother-rated internalizing problems in first grade. In other longitudinal studies, however, closeness was not a significant predictor of internalizing behavior (e.g., Ewing & Taylor, 2009; Henricsson & Rydell, 2006). Furthermore, some evidence has been found that high degrees of closeness are related to more prosocial behavior from fall to spring of the preschool year (Myers & Morris, 2009).

Finally, the few longitudinal studies that investigated the predictive role of dependency suggest that higher levels of dependency are related to more externalizing and internalizing behavior both within and between school years: Henricsson and Rydell (2006) found that more teacher–child dependency in third grade was associated with both more externalizing and more internalizing behavior in sixth grade. Likewise, Ewing and Taylor (2009) showed that high degrees of dependency in the fall of preschool were related to more anxious-fearful behavior in the spring of preschool. To our knowledge, no studies have examined whether teacher–child dependency predicts children's prosocial behavior over time.

In sum, higher levels of conflict were found to predict more externalizing behavior over time and, although less consistently, more internalizing behavior and less prosocial behavior. Evidence for the predictive role of closeness has been less strong, although some studies found that higher degrees of closeness were associated with less internalizing behavior and more prosocial behavior over time. Finally, although the predictive role of dependency has only been scarcely examined, some evidence has been found that higher levels of dependency predict both more externalizing and internalizing behavior. Together, these studies provide evidence that the teacher–child relationship quality predicts children's behavioral adjustment over time. In the next section, we will describe studies that investigated this association in the other direction—that is, they examined children's problem behaviors as predictor of teacher–child relationship quality.

**Children's Problem Behaviors as Predictors of Teacher–child Relationship Quality**

According to the developmental systems theory (Pianta, Hamre, & Stuhlman, 2003), the formation of teacher–child relationships is influenced in part by child characteristics, such as children's problem behaviors. As such, previous research includes investigations of children's problem behaviors as predictors of teacher–child relationship quality. Again, evidence for the predictive role of externalizing behavior for the degree of conflict in the relationship has been most consistent in previous research. Higher levels of externalizing behavior have been shown to predict more conflict in the relationship across school years (e.g., Henricsson & Rydell, 2004; Jerome et al., 2009). For example, Jerome and colleagues (2009) found that externalizing behaviors as rated by mothers at 54 months positively predicted conflict as rated by teachers in sixth grade. Higher levels of externalizing behavior have also been shown to relate with less closeness in the relationship. However, most evidence for the predictive role of externalizing behavior on closeness was found in cross-sectional studies (e.g., Buyse et al., 2008; Thijs,

Westhof, & Koomen, 2012), whereas associations tended to be nonsignificant in longitudinal research (Henricsson & Rydell, 2004; Jerome et al., 2009). The few longitudinal studies that investigated the effect of externalizing behavior on dependency found that higher degrees of externalizing behavior predicted more dependency in the teacher–child relationship (Birch & Ladd, 1998; Henricsson & Rydell, 2004).

Findings have been less consistent with regard to the predictive role of internalizing behavior on teacher–child relationships, especially for conflict. Some longitudinal studies found that shyness (i.e., a temperamental dimension related to internalizing behaviors; Karevold, Ystrom, Coplan, Sanson, & Mathiesen, 2012; Letcher, Smart, Sanson, & Toumbourou, 2009) did not act as a significant predictor of conflict (e.g., Arbeau, Coplan, & Weeks, 2010), whereas other studies found that shyness predicted lower levels of conflict (e.g., Rudasill, 2011). In contrast, other studies showed that internalizing behaviors were associated with higher levels of conflict (e.g., Jerome et al., 2009). Furthermore, internalizing behaviors have been shown to predict lower levels of closeness in the relationship over time (Arbeau et al., 2010; Rudasill, 2011). For example, mothers' ratings of shyness in preschool were found to be associated with lower ratings of closeness by first–grade teachers (Rudasill, 2011). Other longitudinal studies, however, did not find evidence for the predictive role of internalizing behavior for closeness (Henricsson & Rydell, 2004; Jerome et al., 2009). In the studies that examined dependency as outcome variable, higher levels of internalizing behavior were associated with more dependency in the relationship over time (Arbeau et al., 2010; Henricsson & Rydell, 2004).

Finally, a few longitudinal studies also investigated the effect of children's prosocial *behavior* on teacher–child relationship quality. Prosocial behavior seemed to be associated with more closeness and less conflict and dependency in the relationship (Birch & Ladd, 1998;

Henricsson & Rydell, 2004). However, Ladd, Birch, and Buhs (1999) found that children's prosocial behavioral styles did not predict the degree of closeness and conflict in the relationship.

To summarize, high degrees of externalizing behavior were found to predict more conflict and more dependency over time, whereas evidence for the negative impact of externalizing behavior on teacher–child closeness has been less strong. Some evidence has also been found that higher levels of internalizing behavior are related to less closeness and more dependency over time, whereas findings with regard to the predictive role of internalizing behavior for conflict have been contradictory. Finally, the few studies that examined the predictive role of prosocial behavior mostly found that more prosocial behavior was related to lower levels of conflict and dependency and higher levels of closeness. Taken together, there is evidence both for the predictive role of teacher–child relationship quality for children's behavioral adjustment and for behavioral adjustment as predictor of relationship quality. These findings suggest that links between teacher–child relationship quality and children's behavioral adjustment may be reciprocal over time. In the next section, we will discuss cross-lagged studies that actually investigated the bidirectionality of these associations.

**Reciprocal Influences Between Teacher–child Relationships and Behavioral Adjustment**

Transactional models have emphasized reciprocal influences between caregiver-child interactions and children's problem behaviors (see Sameroff & MacKenzie, 2003 for a review). Moreover, these models point to the accumulation of caregivers' and children's negative behaviors over time, that is, if caregivers respond negatively to children's problem behaviors, these problem behaviors are likely to be exacerbated over time (Sameroff & MacKenzie, 2003). Although reciprocal influences between teacher–child relationships and children's behavioral adjustment are generally assumed, most research has only examined unidirectional effects, in

which the teacher–child relationship has been either the predictor or the outcome variable. There are, however, a few studies that did investigate reciprocal effects between teacher–child relationship quality and children's behavioral adjustment.

Doumen and colleagues (2008) investigated reciprocal influences between teacher–child conflict and children's aggressive behavior in a sample of Belgian kindergartners. Teachers reported about conflict and aggression on three occasions (i.e., start, middle, and end) in the kindergarten school year. Doumen and colleagues found a transactional effect, in which aggressive behavior at time 1 had a positive effect on conflict at time 2, which, in turn, had a positive effect on aggressive behavior at time 3. The transactional effect in the other direction (i.e., from conflict at time 1 to aggression at time 2 to conflict at time 3) was not significant.

Zhang and Sun (2011) investigated reciprocal effects between teacher–child closeness and conflict, on the one hand, and children's externalizing problems and internalizing problems, on the other hand, in a sample of Chinese preschoolers. Homeroom teachers rated closeness, conflict, and children's externalizing and internalizing problems on two occasions in the preschool year (i.e., fall and summer). Separate models were tested for externalizing problems and for internalizing problems. Bidirectional influences were found between externalizing problems and teacher–child conflict, that is, externalizing problems at time 1 significantly and positively predicted conflict at time 2, and conflict at time 1 also significantly and positively predicted externalizing problems at time 2. In contrast, no significant associations were found between closeness and externalizing problems over time. With regard to internalizing problems, no significant associations were found with closeness either. For conflict, only an unidirectional effect was found: Internalizing problems at time 1 significantly and positively predicted conflict

at time 2, whereas conflict at time 1 did not predict internalizing problems at time 2 (Zhang & Sun, 2011).

Both Doumen and colleagues (2008) and Zhang and Sun (2011) used teacher reports about both relationship quality and behavioral adjustment. Although this method might lead to shared informant variance and hence to overestimation of associations, teacher reports also have several strengths. First, teachers' reports of relationship quality and behavioral adjustment have found to be reliable and valid (e.g., Doumen, Koomen, Buyse, Wouters, & Verschueren, 2012; Goodman, 2001). In contrast, preschoolers' self-reports often tend to be less reliable than teacher reports (cf. Carter, Briggs-Gowan, & Davis, 2004), and parents do not have firsthand information about what happens in the classroom. In addition, a review of the psychometric qualities of the Strength and Difficulties Questionnaire (i.e., which was used in the present study to measure behavioral adjustment) showed that internal consistency and test–rest reliability was higher for teacher ratings than for parent ratings (Stone, Otten, Engels, Vermulst, & Janssens, 2010). Ratings by observers are also problematic; they are usually based on short time intervals, whereas teachers' judgments of relationship quality and behavioral adjustment are rooted in many daily observations and interactions with children across various situations in the school context (Lakes & Hoyt, 2008). Second, teacher reports have been found to be predictive of school-related outcomes (e.g., behavioral engagement and school trajectories), above and beyond objective test results or observations (Doumen et al., 2012; Pianta, Steinberg, & Rollins, 1995). Following Doumen and colleagues and Zhang and Sun, the present study also used teacher reports of both teacher–child relationships and behavioral adjustment.

To summarize, both the unidirectional studies discussed in the previous sections and the two cross-lagged studies described here, provide evidence for the bidirectionality of the

association between teacher–child relationships and children's behavioral adjustment. However, the previous cross-lagged studies (Doumen et al., 2008; Zhang & Sun, 2011) only focused on one or two dimensions of the teacher–child relationship (i.e., closeness and conflict) and only on one or two dimensions of behavioral adjustment (i.e., externalizing and internalizing behaviors). In the present study, we investigated teacher–child closeness and conflict, as well as dependency. In addition, we simultaneously examined three dimensions of behavioral adjustment in the same model: externalizing behavior, internalizing behavior, and prosocial behavior. Moreover, whereas the previous studies included community samples, we investigated bidirectional influences in a sample of boys at risk for externalizing behavior.

**Boys at Risk for Externalizing Behavior**

According to the academic-risk hypothesis (Hamre & Pianta, 2001), the quality of the teacher–child relationship will be more important for the school functioning of children who are at risk for negative school adjustment. In this view, boys could be considered as being at risk for maladjustment, as they usually display higher levels of externalizing problem behaviors than girls (e.g., Ewing & Taylor, 2009; Silver et al., 2005). In addition, boys, on average, share less close and more conflicted relationships with their teachers than girls (e.g., Baker, 2006; Hamre & Pianta, 2001), although the degree of dependency in the relationship tends to be equal for boys and girls (Ewing & Taylor, 2009; Hamre & Pianta, 2001). Because boys are at risk for behavioral maladjustment and more conflicted and less close teacher–child relationships, we only selected boys to participate in the present study. In addition, in each class, we selected the boy with the highest level of externalizing behavior. As described above, children with higher levels of externalizing behavior are at risk for developing more conflicted, more dependent, and less close relationships with their teachers. Furthermore, externalizing behaviors tend to be

relatively stable across school years (e.g., Buyse et al., 2009; Silver et al., 2005). Therefore, our sample could be viewed as having double risk (i.e., being boys and having relatively high levels of externalizing behavior) for developing both disadvantageous teacher–child relationships and behavioral maladjustment. It should be noted, however, that children were selected based on their externalizing behavior relative to their classmates. Therefore, these boys should not be considered as a clinical sample, but rather as being at risk for developing externalizing problems.

**The Present Study**

In the present study, we examined reciprocal influences between different dimensions of teacher–child relationships (i.e., closeness, conflict, and dependency) and children's behavioral adjustment (i.e., externalizing behavior, internalizing behavior, and prosocial behavior) in a sample of preschool boys at risk for developing externalizing problems. A short-term longitudinal design was used with three measurement waves in one school year, in which teachers reported about both relationship quality and behavioral adjustment. Our design allowed us to test bidirectional influences between teacher–child relationships and behavioral adjustment while controlling for previous levels of each variable and concurrent associations between variables. In this way, our design provides a stringent test of possible reciprocal effects.

First, based on transactional models (Sameroff & MacKenzie, 2003) and previous research that has shown effects in both directions, we hypothesized that teacher–child relationships and children's behavioral adjustment would be reciprocally related over time. Second, based on previous studies, we expected to find consistent and positive associations between conflict and externalizing behavior, and negative associations between conflict and prosocial behavior. Because of contradictory findings in previous research, we did not have clear expectations of whether links between conflict and internalizing behavior would be negative,

positive, or non-existent. For closeness, we hypothesized that there would be negative associations with externalizing and internalizing behavior, and positive relations with prosocial behavior. With regard to dependency, we expected to find positive associations with externalizing and internalizing behavior and negative relations with prosocial behavior.

## Method

### Sample

Our sample consisted of 175 preschool children (all boys) and their 175 teachers from 46 mainstream schools in Flanders, the Dutch-speaking part of Belgium (Vancraeyveldt, Verschueren, Van Craeyevelt, Wouters, & Colpin, 2013). These boys were in either the second or third preschool group (aged 3 to 5 years) and were on average 4 years and 9 months old (*SD* = 7 months). Most boys (90.9%) and their parents (84.0% mothers, 85.7% fathers) were of Belgian nationality. Less than half of children's parents completed higher education (45.1% mothers, 38.9% fathers). The other parents finished senior high school (35.4% mothers, 34.9% fathers), junior high school (14.3% mothers, 18.2% fathers), or primary school (2.9% mothers, 4.0% fathers). Educational level was unknown for 2.3% of the mothers and 4.0% of the fathers.

Teachers' (172 women) mean age was 38 years and 11 months (*SD* = 8 years, 11 months) and they had, on average, 17 years of teaching experience (*SD* = 9 years). Per classroom, only one boy and one teacher were selected for participation. Most teachers (81.3%) worked full-time, and 18.7% of the teachers worked part-time. Of these part-time teachers, only the teacher who spent the most time in the classroom participated in the present study.

### Selection and Procedure

In Flanders, preschool education is available for children aged 2.5 to 6 years. As children move to the next preschool year, they get a different teacher. Typically, only one adult (i.e., the

classroom teacher) is present in the classroom at the same time. Teaching assistants are not available in most Flemish classrooms. The data collection spanned two school years (2009-2010 and 2010-2011). In the first year (2009-2010), children were recruited for participation while they were in the first (3-4 years) or second (4-5 years) preschool group. Parental consent for participation in a screening procedure was obtained for 3613 children. Children were selected to participate if their teacher ranked them as the boy with the highest level of externalizing behavior on the Externalizing Behavior scale of the Preschool Behavior Questionnaire (PBQ; Behar, 1977; Dutch adaptation by Thijs, Koomen, De Jong, Van der Leij, & Van Leeuwen, 2004). If the boy with the highest score was not able to participate (e.g., due to parental refusal), the boy with the second highest score was selected, and so on. The mean score on Externalizing Behavior for the selected boys ($M$ = 2.24, $SD$ = 0.69) was more than 1.5 $SD$ above the mean score of the boys who were not selected for participation, $M$ = 1.45, $SD$ = 0.51; $t$ (195.408) = -14.62, $p < .001$. The ratings on the PBQ were only used for the selection of children and are not included in the main analyses.

In the second year (2010-2011), while children were in the second (4-5 years) or third (5-6 years) preschool group, the child's new preschool teacher completed surveys about the child's behavioral adjustment and the teacher–child relationship quality at three time points. Due to practical reasons, there was some variation in the exact moments of data collection between schools. However, we ensured that for each teacher there were 6 weeks between each occasion. These 6-week intervals were chosen to be able to detect short-term changes in associations between teacher–child relationships and behavioral adjustment and to allow the scheduling of three measurement occasions within one school year. As the Flemish school year starts on the first of September and teachers needed time to get to know the child, Time 1 was not scheduled

during the first month of the school year. In addition, the Flemish school year ends in June and, therefore, Time 3 was scheduled to be completed in May. Thus, Time 1 was situated from October to December 2010, Time 2 from December 2010 to March 2011, and Time 3 from February to May 2011. Questionnaires were sent to the teachers and collected after 2 weeks. Although we do not know the exact moment at which the teachers filled out the questionnaires during these 2 weeks, we wanted to give teachers ample opportunity to complete the questionnaires at their convenience. At the end of the second year, 166 teachers and children (94.9%) still participated in the study. Drop-out was due to school changes (three children), long-term absence of the child (two children), or withdrawal from participation by the teacher (four children). The response rates for the teacher questionnaires were 98.3%, 94.3%, and 87.4% at Time 1, Time 2, and Time 3, respectively. Parents reported about their children's and their own nationality and their obtained educational level at Time 1.

## Measures

**Teacher–child Relationship Quality.** A Dutch adaptation of the Student–Teacher Relationship Scale (STRS; Koomen, Verschueren, & Pianta, 2007) was used to measure teachers' perceptions of the degree of Closeness (11 items, e.g., "I share an affectionate, warm relationship with this child"), Conflict (11 items, e.g., "This child and I always seem to be struggling with each other"), and Dependency (six items, e.g., "This child reacts strongly to separation from me") in their relationship with an individual child. Items were rated on a 5-point scale ranging from 1 (*definitely does not apply*) to 5 (*definitely applies*). Previous studies have reported adequate internal consistency scores for the Dutch version of the STRS (Cronbach's alphas ranging between .87-.94 for Closeness, .84-.91 for Conflict, and .74-.82 for Dependency; Doumen et al., 2012; Koomen et al., 2007; Koomen, Verschueren, Van Schooten, Jak, & Pianta, 2012; Spilt,

Koomen, & Jak, 2012) and high test–retest reliability coefficients for the original version (test–retest reliability with a 4-week interval was .88 for Closeness, .92 for Conflict, and .76 for Dependency; Pianta, 2001). Support has also been provided for the convergent and predictive validity of the STRS (e.g., Doumen et al., 2009; Doumen et al., 2012; Koomen et al., 2012). In the present study, Cronbach's alpha coefficients were .85, .87, and .88 for Closeness, .86, .90, and .88 for Conflict, and .77, .86, and .83 for Dependency at Time 1, Time 2, and Time 3, respectively.

**Children's Behavioral Adjustment.** Teachers (i.e., the same teacher as the teacher who completed the STRS) reported about children's behavioral adjustment on a Dutch translation of the Strengths and Difficulties Questionnaire (SDQ; Van Widenfelt, Goedhart, Treffers, & Goodman, 2003). The SDQ is a widely used screening instrument for psychosocial and behavioral adjustment, which consists of 25 items. Originally, five subscales of the SDQ are distinguished. However, recent research has found evidence that a three-factor structure provides comparable, and in some cases even better, results than the five-factor structure (Dickey & Blumberg, 2004; Goodman, Lamping, & Ploubidis, 2010; Van Leeuwen, Meerschaert, Bosmans, De Medts, & Braet, 2006). In the present study, we used the three-factor solution, because support for these three factors was found in a Flemish sample (Van Leeuwen et al., 2006) and because the use of five factors would make our models even more complex. Externalizing Behavior consists of ten items (e.g., "Restless, hyperactive, cannot sit still for long", "Easily distracted, concentration wanders", "Often has temper tantrums or hot tempers", and "Often fights with other children"). Internalizing Behavior contains eight items (e.g., "Complains about headaches, stomachaches, or sickness", "Rather solitary, tends to play alone", "Gets on better with adults than with other children", and "Picked on or bullied by other children"). Prosocial

Behavior consists of seven items (e.g., “Often volunteers to help others”, “Shares readily with other children, “Generally liked by other children”, and “Has at least one good friend”). Items are scored on a 3-point Likert scale ranging from 0 (*not true*) to 2 (*certainly true*).

Satisfactory internal consistency coefficients (mean internal consistency values ranging from .63 to .83) and test–retest reliability coefficients (mean test–retest correlation values ranging from .72 to .85) have been reported for the SDQ (see Stone et al., 2010 for a review). Previous research has supported the validity of the SDQ (e.g., Goodman, 1997, 2001; Goodman & Scott, 1999; Stone et al., 2010), and some evidence has also been found that the SDQ is sensitive in detecting changes over time (Mason, Chmelka, & Thompson, 2012). Cronbach’s alpha coefficients in the present study were .78, .81, and .78 for Externalizing Behavior, .62, .71, and .69 for Internalizing Behavior, and .72, 82, and .82 for Prosocial Behavior at Time 1, Time 2, and Time 3, respectively.

**Analyses**

To assess the reciprocal associations between teacher–child relationship quality and children’s behavioral adjustment, a cross-lagged structural equation modeling (SEM) approach in Mplus Version 6.1 (Muthén & Muthén, 1998-2010) was used. Separate models were built for each of the three relationship dimensions (i.e., Closeness, Conflict, and Dependency). In our cross-lagged design, each variable was measured at three occasions, yielding within-time correlations (i.e., correlations between all variables at a specific time point), autoregressive or stability paths (i.e., prediction of a variable by its own level at the previous time point), and cross-lagged paths (i.e., prediction of a variable by another variable that has been measured at the previous time point, controlling for the previous level of the predicted variable; Kline, 2011). Cross-lagged paths were inserted from Closeness (or Conflict or Dependency) to Externalizing

Behavior, Internalizing Behavior, and Prosocial Behavior, and from Externalizing Behavior, Internalizing Behavior, and Prosocial Behavior to Closeness (or Conflict or Dependency). To enhance model fit, we also included autoregressive paths from Time 1 to Time 3 for all variables in each model. Because our data were derived from an intervention study (Vancraeyveldt et al., 2013), we controlled for condition (0 = control condition, 1 = intervention condition) in all models by estimating paths from condition to all other variables in the model. For reasons of clarity, the path coefficients for this covariate are presented in a separate table (see Table 2).

The chi-square index ($\chi^2$), the root mean square error of approximation (RMSEA), and the comparative fit index (CFI) were used to evaluate model fit. The $\chi^2$ should be as small as possible. CFI values above .90 are considered indicative of acceptable fit, and above .95 as indicative of good fit. RMSEA values under .06 are considered indicative of good fit and under .08 as indicative of acceptable fit, whereas values of .10 or higher indicate poor fit (Hu & Bentler, 1999; Kline, 2011). For each relationship dimension, three nested models were tested and compared. In our first model, all paths were freely estimated. In the second model, the unstandardized autoregressive paths were constrained to be equal across the two time intervals (e.g., the path from Closeness Time 1 to Closeness Time 2 was set equal to the path from Closeness Time 2 to Closeness Time 3), which would result in a more parsimonious model with more reliable parameter estimates. In our final model, we also constrained the cross-lagged paths (e.g., the path from Closeness to Externalizing Behavior was set equal across Time 1-Time 2 and Time 2-Time 3), to create an even more parsimonious model. Paths were set equal if the model had a comparable (or better) fit as the model in the previous step. Thus, model 2 (autoregressive paths constrained) was compared with model 1 (unconstrained) and model 3 (cross-lagged paths constrained) was compared with model 2. Models were considered as having equivalent fit if at

least two of the following criteria were satisfied (Cheung & Rensvold, 2002; Vandenberg & Lance, 2000): $\Delta\chi^2$ nonsignificant at $p > .05$, $\Delta$CFI < .010, and $\Delta$RMSEA < .015.

Standardized path coefficients were used as effect sizes. Effect sizes around .10 could be considered as 'small', effect sizes around .30 as 'medium', and effect sizes around .50 as 'large' (Kline, 2005). Cross-lagged paths in previous models connecting teacher-child relationships and children's behavioral adjustment (i.e., Doumen et al., 2008; Zhang & Sun, 2011) were medium (standardized path coefficients ranging from .21 to .30). Across all analyses, an a priori alpha level of .05 was established to determine statistical significance.

## Results

### Preliminary Analyses

Correlations between study variables are presented in Table 1. All study variables seemed to be stable from Time 1 to Time 2 and from Time 2 to Time 3, as well as from Time 1 to Time 3. However, some variables were more stable than others (correlations ranging from .49 for Dependency from Time 1 to Time 3 to .81 for Conflict from Time 2 to Time 3). Conflict was positively related to both Externalizing Behavior and Internalizing Behavior and negatively to Prosocial Behavior both within and across measurement occasions. Closeness was negatively associated with Externalizing Behavior (except for Closeness Time 1 with Externalizing Behavior Time 2 and Time 3) and positively associated with Prosocial Behavior both cross-sectionally and over time, whereas Closeness was not significantly associated with Internalizing Behavior (except for Closeness Time 1 with Internalizing Behavior Time 1 and Time 3). Dependency was also positively associated with both Externalizing Behavior and Internalizing Behavior, cross-sectionally as well as over time (except for Dependency Time 1 with

Externalizing Behavior Time 3), whereas associations between Dependency and Prosocial Behavior were only occasionally significant.

Mean scores, standard deviations, and minimum and maximum scores of the study variables are also reported in Table 1. To get an indication of the level of behavioral adjustment of the present sample, we compared the mean scores on the SDQ Externalizing Behavior, Internalizing Behavior, and Prosocial Behavior subscales at Time 1 with the scores of a Flemish reference sample (4- to 5 year-old boys, $N = 630$; Van Leeuwen et al., 2006). Mean scores for Externalizing Behavior were above the 80th percentile but below the 90th percentile of the reference group. Mean scores for Internalizing Behavior were above the mean of the reference group but below the 80th percentile. Mean scores for Prosocial Behavior were below the 20th percentile but above the 10th percentile of the reference group. These comparisons suggest that, in general, our sample has relatively high, but not extreme, levels of internalizing behavior and especially externalizing behavior and relatively low, but not extreme, levels of prosocial behavior.

Similarly, to get an indication of the level of the teacher–child relationship quality in the present sample, we compared the mean scores of the three STRS subscales at Time 1 with the scores of a Dutch reference sample (5-year old boys, $N = 123$; Koomen et al., 2007) because a Flemish reference sample as not available. The mean score for Closeness in our sample was one standard deviation below the mean Closeness level of the reference group, whereas the mean score for Conflict was half a standard deviation above the mean Conflict level of the reference group. The mean score of Dependency in our sample was similar to the mean Dependency level of the reference group. As such, the sample in this study showed less Closeness, more Conflict, and a comparable amount of Dependency in comparison to the reference sample.

**Conflict and Behavioral Adjustment**

With regard to Conflict and children's behavioral adjustment, the unconstrained model and the model with autoregressive paths constrained had comparable model fit, $\Delta\chi^2$ (4) = 8.61, $p$ = .072; ΔCFI = .003; ΔRMSEA = .004, whereas inclusion of constraints on the cross-lagged paths significantly reduced model fit, $\Delta\chi^2$ (6) = 25.35, $p$ < .001; ΔCFI = .015; ΔRMSEA = .020. Therefore, the autoregressive paths were set equal over time, whereas the cross-lagged paths were freely estimated. The fit of this final model was good, $\chi^2$ (28) = 44.20, $p$ = .027; CFI = .99; RMSEA = .06. Figure 1 displays the final model for Conflict and the behavioral adjustment variables. Conflict, Externalizing Behavior, Internalizing Behavior, and Prosocial Behavior were stable over time (βs = .52 to .65, $p$s < .001). A transactional effect was found for Conflict and Prosocial Behavior, in which Conflict at Time 1 negatively predicted Prosocial Behavior at Time 2 (β = -.13, $p$ = .027), and Prosocial Behavior at Time 2 negatively predicted Conflict at Time 3 (β = -.11, $p$ = .041). This transactional effect was not found in the other direction (i.e., from Prosocial Behavior Time 1 to Conflict Time 2 to Prosocial Behavior Time 3; $p$ = .650 and .104 respectively). Conflict at Time 1 positively predicted Externalizing Behavior and Internalizing Behavior at Time 2 (β = .25, $p$ < .001 and β = .18, $p$ = .003 respectively). In addition, Externalizing Behavior and Internalizing Behavior at Time 1 positively predicted Conflict at Time 2 (β = .17, $p$ = .004 and β = .12, $p$ = .018 respectively). Unexpectedly, bidirectional effects between Conflict, Externalizing Behavior, and Internalizing Behavior were not replicated from Time 2 to Time 3 ($p$s = .507 to .804). In general, the significant path coefficients in the Conflict model could be interpreted as small to medium.

**Closeness and Behavioral Adjustment**

For Closeness and the behavioral adjustment variables, constraints on the autoregressive paths, $\Delta\chi^2$ (4) = 9.97, $p$ = .041; ΔCFI = .005; ΔRMSEA = .002, and the cross-lagged paths, $\Delta\chi^2$ (6) = 2.20, $p$ = .900; ΔCFI = .004; ΔRMSEA = .011, did not reduce model fit. Therefore, we chose the most parsimonious model with both autoregressive and cross-lagged paths constrained to be equal over time. The fit of this constrained model was adequate, $\chi^2$ (34) = 61.16, $p$ = .003; CFI = .98; RMSEA = .07. The final model for Closeness and children's behavioral adjustment is presented in Figure 2. Closeness, Externalizing Behavior, Internalizing Behavior, and Prosocial Behavior were stable over time (βs = .55 to .61, $p$s < .001). Internalizing Behavior positively predicted Closeness, both from Time 1 to Time 2 and from Time 2 to Time 3 (β = .07, $p$ = .046 and β = .08, $p$ = .044 respectively), whereas Closeness did not predict Internalizing Behavior ($p$ = .904 both from Time 1 to Time 2 and from Time 2 to Time 3). Reciprocal influences were found for Closeness and Prosocial Behavior in both directions: Closeness at Time 1 positively predicted Prosocial Behavior at Time 2 (β = .14, $p$ = .004), and Prosocial Behavior at Time 2 positively predicted Closeness at Time 3 (β = .15, $p$ = .004). In the same way, Prosocial Behavior at Time 1 positively predicted Closeness at Time 2 (β = .14, $p$ = .004) and Closeness at Time 2 positively predicted Prosocial Behavior at Time 3 (β = .13, $p$ = .004). Closeness and Externalizing Behavior were not significantly related over time ($p$s = .230 to .892). In general, the associations in the Closeness model could be considered as being small.

**Dependency and Behavioral Adjustment**

With respect to Dependency and the behavioral adjustment variables, inclusion of constraints on the autoregressive paths, $\Delta\chi^2$ (4) = 6.86, $p$ = .143; ΔCFI = .003; ΔRMSEA = .004, and the cross-lagged paths, $\Delta\chi^2$ (6) = 9.28, $p$ = .158; ΔCFI = .003; ΔRMSEA = .006, did not reduce model fit. Therefore, we chose the most parsimonious model and constrained both the

autoregressive and the cross-lagged paths to be equal over time. The fit of this final model was adequate, $\chi^2$ (34) = 79.42, $p < .001$; CFI = .96; RMSEA = .09. The final model for Dependency and the behavioral adjustment variables is displayed in Figure 3. Dependency and children's behavioral adjustment were stable over time (βs = .41 to .68, *p*s < .001). Reciprocal effects were found for Dependency and Internalizing Behavior in both directions: Dependency at Time 1 positively predicted Internalizing Behavior at Time 2 (β = .10, $p = .018$) and Internalizing Behavior at Time 2 positively predicted Dependency at Time 3 (β = .28, $p < .001$). Likewise, Internalizing Behavior at Time 1 positively predicted Dependency at Time 2 (β = .24, $p < .001$) and Dependency at Time 2 positively predicted Internalizing Behavior at Time 3 (β = .13, $p = .017$). Dependency negatively predicted Prosocial Behavior both from Time 1 to Time 2 and from Time 2 to Time 3 (β = -.09, $p = .012$ and β = -.11, $p = .011$ respectively), whereas Prosocial Behavior did not predict Dependency ($p = .933$ both from Time 1 to Time 2 and from Time 2 to Time 3). Dependency and Externalizing Behavior did not affect each other (*p*s = .099 to .170). In general, the paths in the Dependency model could be interpreted as being small to medium.

## Discussion

In the present study, we investigated reciprocal influences between teacher–child relationships (i.e., closeness, conflict, and dependency), on the one hand, and children's behavioral adjustment (i.e., externalizing behavior, internalizing behavior, and prosocial behavior), on the other, in a sample of preschool boys at risk for developing externalizing problems. We used a short-term longitudinal design, in which relationship quality and adjustment variables were measured at three occasions. When interpreting the findings discussed below, it will be important to keep in mind that teachers reported about both relationship quality and behavioral adjustment. This measurement method might lead to an overestimation of the

strength of associations. However, as bidirectional relations over time were examined above and beyond within-time associations and stability of constructs, our cross-lagged models still provide a stringent test of transactional effects (Doumen et al., 2008; Eisenberg et al., 1999). In addition, as we only selected boys with relatively high levels of externalizing behavior, the reader should be careful in generalizing our findings to other groups of children (e.g., girls and children with low levels of externalizing behavior or high levels of internalizing behavior). The found associations were only small to medium (cf. Kline, 2005), however, cross-lagged paths were controlled for within-time associations and stability coefficients. Moreover, although most path coefficients were smaller than in previous cross-lagged models (i.e., Doumen et al., 2008; Zhang & Sun, 2011), our models included more variables than these previous models.

**Teacher–Child Conflict and Children's Behavioral Adjustment**

As we used an at-risk sample of boys at risk for developing externalizing problems, we expected that associations between conflict and children's behavioral adjustment would be especially strong in this sample (cf. Hamre & Pianta, 2001). Surprisingly, however, bidirectional effects between conflict and both externalizing behavior and internalizing behavior were only found from time 1 (i.e., October to December) to time 2 (i.e., December to March) but not from time 2 to time 3. The findings of Zhang and Sun (2011) and Doumen and colleagues (2008), however, suggested that conflict and children's externalizing and internalizing behaviors also influence each other during the second half of the school year. The present study used a double-risk sample (i.e., boys rated by their previous teacher as displaying high levels of externalizing behavior relative to their classmates), whereas the other two studies were based on a community sample. Our findings suggest that in risk samples, externalizing and internalizing behaviors and conflict mainly affect each other during the first months of the school year, when relationships

with the new teacher are formed, and not during the second half of the year, when interaction patterns are more firmly established. Thus, to prevent the development of conflicted teacher–child relationships in at-risk samples, it seems that intervention in conflicted teacher–child relationships or problem behaviors earlier in the school year may be important. In addition, the present study used more measurement occasions than Zhang and Sun (2011), who used only two occasions, and included more indicators of children's behavioral adjustment than both Zhang and Sun (2011) and Doumen and colleagues (2008). It might be that associations between conflict and behavioral adjustment were not found from time 2 to time 3 because we included more variables in our models than previous studies.

In addition, a transactional sequence was found for conflict and prosocial behavior, in which more conflicted relationships with the teacher at time 1 predicted lower levels of prosocial behavior at time 2, which, in turn, led to more conflicted relationships at time 3. Effects between conflict and prosocial behavior were not fully reciprocal. That is, prosocial behaviors at time 1 did not predict less conflict at time 2, and less conflict at time 2 did not predict more prosocial behavior at time 3. This finding is is an interesting one, as Doumen and colleagues (2008) found that transactional effects between conflict and aggressive behavior started with aggression at time 1, indicating that it was mainly the child's behavior that started the accumulation of negative processes across the kindergarten school year (Doumen et al., 2008). In contrast, for prosocial behavior and conflict in this at-risk sample, it seemed to be mainly the degree of conflict that elicits less prosocial behavior in the child, which in turn leads to more even more conflict at time 3.

**Teacher–Child Closeness and Children's Behavioral Adjustment**

Reciprocal effects over time were found for closeness and prosocial behavior. Thus, close teacher–child relationships and more prosocial child behaviors seem to strengthen each other during the school year. These findings suggest that prosocial behavior might act as a protective factor (cf. Ladd et al., 1999) for boys at risk for developing externalizing problems; if boys with relatively high levels of externalizing behavior also display prosocial behaviors, these prosocial behaviors may protect them against negative consequences of their externalizing behaviors on relationship formation. Although these reciprocal effects are beneficial for children who enter preschool with prosocial behavioral styles, it also means that children who do not display such positive behaviors at the start of preschool or fail to develop a close relationship with their teacher within the first few months are at risk for becoming entrapped in vicious cycles in which teacher–child relationships become even less close and children's behaviors even less prosocial.

Furthermore, we found unidirectional, positive associations between internalizing behavior and closeness, which were consistent from time 1 to time 2 and from time 2 to time 3. These associations were small, however, they were found after controlling for within-time associations and the stability of internalizing behavior and closeness. The fact that these associations were positive was somewhat surprising, because previous research has mostly shown that higher levels of internalizing behavior (e.g., Buyse et al., 2008; Thijs & Koomen, 2009) as well as shyness (e.g., Arbeau et al., 2010; Rudasill, 2011) are related to less closeness in the relationship. In contrast, observational studies found some evidence that during actual interactions, teachers initiated more interactions with anxious–fearful children (Coplan & Prakash, 2003) and showed more support (Thijs & Koomen, 2008) and more affiliation (i.e., warm, supportive behaviors; Roorda, Koomen, Spilt, Thijs, & Oort, 2013) toward children with internalizing behaviors. It might be that teachers in our present sample also behaved more

supportively towards children with internalizing behaviors, which might explain the closer relationships with these children. However, as observations were not available, we were not able to investigate this hypothesis in the present study. It is also possible that the unique effect of internalizing behavior over time (i.e., after controlling for stability, concurrent associations, and the other behavioral dimensions) is positive, but that less stringent models would produce negative effects. In line with this hypothesis, zero-order correlations between internalizing behavior and closeness were not significant or were negative in the present study (see Table 1). Within time associations between both variables were also negative ($r$ = -.20, $p$ = .006 at time 1, $r$ = -.18, $p$ = .028 at time 3) or not significant (at time 2).

When interpreting these results, it is also important to keep our selection criteria in mind (i.e., selection was solely based on having high levels of externalizing behavior, whereas children's levels of internalizing behaviors were not taken into account). Although there is a considerable range in both children's externalizing and internalizing behaviors in the present sample, results could have been different if children would have been selected based on their levels of internalizing behavior (e.g., high levels of internalizing behavior in combination with low levels of externalizing behavior).

The degree of closeness in the relationship did not affect children's internalizing behaviors over time. This finding suggests that warm, supportive behaviors with teachers alone are not enough to help children to overcome their anxious, withdrawn behaviors, at least not for preschool boys who are also at risk for developing externalizing problems.

Closeness was not associated with externalizing behavior over time. With respect to externalizing behavior as predictor of closeness, it might be that the effect of externalizing behavior on closeness is leveled out over time. That is, there may be moments during which the

disruptive behaviors of externalizing children make it very hard for teachers to be warm and supportive towards them, whereas there may also be moments during which the teacher deliberately shows more warmth and support towards these children in order to stimulate them to behave more positively (cf. Thijs, Koomen, & Van der Leij, 2008). In addition, Roorda and colleagues (2013) found that children with higher levels of externalizing behavior did not show less affiliation (i.e., warm, friendly behaviors) towards their teacher than children with lower levels of externalizing behavior, which might also explain why externalizing behavior was not associated with the degree of closeness.

When considering closeness as predictor of externalizing behavior, it seems that high degrees of closeness are not enough to make children behave less disruptively. Rather, the significant association between conflict and externalizing behavior during the first half of the school year suggests that a decrease in conflict would be more influential in diminishing children's externalizing behaviors than an increase in closeness. These findings are also in line with previous research showing that conflict predicted externalizing behavior over time (e.g., Buyse et al., 2009; Silver et al., 2005), whereas closeness did not (e.g., Buyse et al., 2009; Ewing & Taylor, 2009). Moreover, Zhang and Sun (2011) did not find cross-lagged associations between closeness and externalizing behavior either. Together, these findings seem to indicate that closeness and externalizing behavior do not affect each other over time.

Finally, whereas previous research has mostly reported stronger and more consistent associations of behavioral problems with conflict than with closeness (e.g., Buyse et al., 2009; Jerome et al., 2009; Zhang & Sun, 2011), we did not find evidence for more stable links over time with conflict, as opposed to closeness. Our results seem to indicate that the relative importance of the relationship dimensions depends on the specific dimensions of behavioral

adjustment (i.e., prosocial behavior versus externalizing behavior) that are investigated and on the risk status of the sample (i.e., boys at risk for developing externalizing problems versus community samples). Future research could examine the relative importance of closeness and conflict for different types of behavior in other samples.

**Teacher–Child Dependency and Children's Behavioral Adjustment**

Reciprocal effects over time were found for dependency and internalizing behavior: Dependent teacher–child relationships and internalizing behaviors seemed to reinforce each other over time. Roorda and colleagues (2013) found that teachers displayed more controlling and dominant behaviors toward internalizing children than toward their average peers, which, in turn, led to more passiveness and less initiative in the child. Likewise, it has been shown that shy children spoke less during Show and Tell when their teacher asked more questions (Evans & Bienert, 1992). These findings seem to suggest that internalizing children elicit certain behaviors from their teachers (i.e., more controlling and dominant behaviors), which tend to make them even more dependent and helpless (i.e., more passive and withdrawn and less talkative). The reciprocal effects between dependency and internalizing behavior in the present study suggest that child and teacher behaviors strengthen each other over time, leading to increased levels of both dependency and internalizing behavior at the end of the preschool year. Teachers could try to break this vicious cycle by actively promoting more autonomy in internalizing children. However, as noted before, it is important to consider the selection criteria of the present study. Our findings might have been different if, for example, we had selected children with high levels of internalizing behavior instead of high levels of externalizing behavior. Therefore, for future research, it seems important to select children with different behavior profiles (see Roorda et al., 2013 for example). It is also interesting to note that the cross-lagged paths from internalizing

behavior to dependency were--together with the path from conflict time 1 to externalizing behavior time 2--the strongest paths in the present study. Although dependency has been less frequently investigated than closeness and conflict, this finding suggests that it is important to include dependency also in future research about teacher-child relationships and behavioral adjustment.

We also found unidirectional, negative effects of dependency on prosocial behavior, which were consistent from time 1 to time 2 and from time 2 to time 3. Prosocial behavior, however, did not predict the degree of dependency in the teacher–child relationship. Likewise, for the transactional link between conflict and prosocial behavior, it was also the relationship that initiated the process of influence. In contrast, in the unidirectional association between internalizing behavior and closeness, it was children's behavioral adjustment that predicted teacher–child relationship quality. This latter finding is more in line with the transactional sequence between aggression and teacher–child conflict found by Doumen and colleagues (2008), which also started with children's behavioral adjustment. Together, these findings seem to suggest that longitudinal associations with prosocial behavior are mostly initiated by the relationship, whereas in associations with other dimensions of children's behavioral adjustment (e.g., internalizing behavior and aggression) it is mostly the child's behavior that starts the process of influence. More research is needed to find out why the teacher–child relationship is the predictor in the associations with prosocial behavior, whereas children's problem behaviors are the predictor in the longitudinal links with other dimensions of behavioral adjustment. In addition, future studies could investigate whether these findings could be replicated in other groups of children, such as girls and children selected based on their levels of internalizing behavior.

Finally, we did not find associations between dependency and externalizing behavior either. This finding was somewhat surprising, as some previous studies did find significant associations between dependency and externalizing behavior (e.g., Birch & Ladd, 1998; Henricsson & Rydell, 2006). However, we do not know any study that tested a cross-lagged model for dependency and externalizing behavior, which may indicate that effects will only be found in less stringent, unidirectional models. In general, dependency has been far less often investigated than the closeness and conflict dimensions of the relationship. Future research could further examine associations between dependency and children's school functioning.

**Limitations and Future Research**

Some limitations need to be taken into account when interpreting the results of the present study. First, teachers reported about both teacher–child relationship quality and children's behavioral adjustment, which might lead to shared informant variance. However, we controlled for within-time associations between variables in all models, indicating that the cross-lagged effects that were found could not be entirely explained by shared informant bias (Doumen et al., 2008; Eisenberg et al., 1999). Furthermore, teacher reports on the STRS and the SDQ have been found to be related to other informants' views, such as child reports, parent reports, peer nominations, and independent observer ratings (Doumen et al., 2009; Doumen et al., 2012; Goodman, 2001; Van Leeuwen et al., 2006). Still, it would be useful for future research to include other informants' views on teacher–child relationship quality and children's behavioral adjustment in cross-lagged models.

Second, our sample consisted of boys who were rated by their previous teacher as high on externalizing behavior compared to their classmates. We chose this sample because we expected that such an at-risk group would be more strongly affected by teacher–child relationship quality

than children who are not at risk for academic maladjustment (Hamre & Pianta, 2001). Nevertheless, more research is needed to find out whether our findings could be generalized to other groups of children, such as girls, children who are at risk for developing internalizing problems, children without special risks for developing behavior problems, or children who display clinical levels of externalizing or internalizing behavior.

Third, our study was conducted in Belgium and most children were of Belgian nationality. Furthermore, previous studies using cross-lagged models to investigate reciprocal effects between teacher–child relationships and behavioral adjustment that we are aware of either used a Belgian sample (Doumen et al., 2008) or were conducted in China (Zhang & Sun, 2011). It would be interesting for future research to test cross-lagged models for teacher–child relationship quality and children's behavioral adjustment in other countries and with ethnic minority groups.

Fourth, we did not distinguish between different subdimensions of externalizing and internalizing behavior. However, Spilt and colleagues (2010), for example, found that closeness was significantly and negatively related with aggression, whereas it was not significantly associated with attention deficit hyperactivity disorder both when teacher and child reports of the relationship were used. Therefore, different reciprocal effects might be found depending on which subdimension of externalizing or internalizing behavior is investigated. Future research might examine reciprocal influences for the different aspects of children's externalizing and internalizing behaviors in more detail. Finally, teacher–child relationships and children's behavioral adjustment are also likely to be influenced by classroom characteristics, such as class size and classroom climate (e.g., Buyse et al., 2008; National Institute of Child Health and Human Development, 2004). Therefore, future research could investigate whether the associations found would still exist if these classroom characteristics were taken into account.

**Implications for School Practice**

Our findings could help to make intervention and prevention programs more adapted to specific behavioral and relational needs. First, previous interventions focused either on promoting teacher–child relationships or on reducing children's problem behaviors. In contrast, the reciprocal effects between closeness and prosocial behavior and between dependency and internalizing behavior suggest that to promote close, non-dependent relationships and prosocial behaviors and to reduce internalizing problems, it would be most beneficial to focus interventions on teacher–child relationships and behavioral adjustment simultaneously (cf. Zhang & Sun, 2011). For example, to stimulate children's prosocial behavior, it might be most effective to combine a social skills training with a focus on the promotion of warmth and support in the teacher–child relationship. In contrast, internalizing children might benefit most from help in overcoming their anxieties and withdrawn behaviors in combination with teachers who behave less dominantly towards these children (cf. Roorda et al., 2013) and who actively try to promote their autonomy in the relationship. If simultaneous treatment of relationship quality and behavioral adjustment is not possible, it seems at least important to follow up how an intervention directed at the child additionally affects teachers' behaviors and vice versa (cf. Doumen et al., 2008; Pianta et al., 2003). Second, the lack of associations between externalizing behavior and both closeness and dependency suggests that interventions directed at children's externalizing behaviors would be most effective if they focus on the degree of conflict in the relationship. Third, interventions targeted at preventing the escalation of externalizing behaviors and teacher–child conflict will be most efficient at the start of the preschool school year, because bidirectional effects between teacher–child conflict and externalizing behavior were only found during the first half of the year. In sum, our results seemed to indicate that it is very important

that teachers become aware of the influence that their relationships with children can have on the behavioral adjustment of boys at risk for developing externalizing problems. Furthermore, school psychologists could benefit from our study as it offers specific information about which dimensions of the teacher–child relationship and children's behavioral adjustment could best be focus of intervention based on the specific behavioral and relational problems of a particular teacher–child dyad.

## Conclusion

Despite its limitations, the present study indicates that teacher–child relationship quality and children's behavioral adjustment influence each other during the course of the preschool year. However, associations were more consistent for some dimensions of the relationship and behavioral adjustment than for others. Bidirectional effects were most consistent for closeness and prosocial behavior and for dependency and internalizing behavior, whereas both closeness and dependency were not significantly associated with externalizing behavior over time. The found reciprocal effects suggest that interventions would be most effective when they focus on the teacher–child relationship and on children's problem behaviors simultaneously (cf. Zhang & Sun, 2011) and when they are not only directed at the child but also at the teacher (cf. Doumen et al., 2008). Finally, conflict and children's internalizing and externalizing behaviors were only bidirectionally associated during the first half of the school year. Therefore, interventions targeted at reducing externalizing and internalizing problems and teacher–child conflict might be most efficient at the beginning of the preschool year.

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Table 1.

*Descriptive statistics and correlations for all study variables*

| | *N* | *M (SD)* | Min. | Max. | 1. | 2. | 3. | 4. | 5. | 6. | 7. |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 1. STRS Closeness T1 | 172 | 3.69 (0.67) | 1.91 | 4.91 | - | | | | | | |
| 2. STRS Closeness T2 | 165 | 3.86 (0.67) | 1.64 | 5.00 | .66** | - | | | | | |
| 3. STRS Closeness T3 | 153 | 3.98 (0.67) | 1.91 | 5.00 | .62** | .72** | - | | | | |
| 4. STRS Conflict T1 | 172 | 1.91 (0.74) | 1.00 | 3.91 | -.27** | -.25** | -.16* | - | | | |
| 5. STRS Conflict T2 | 165 | 1.87 (0.82) | 1.00 | 4.36 | -.21** | -.40** | -.31** | .72** | - | | |
| 6. STRS Conflict T3 | 153 | 1.80 (0.71) | 1.00 | 4.45 | -.16* | -.29** | -.42** | .68** | .81** | - | |
| 7. STRS Dependency T1 | 171 | 1.83 (0.70) | 1.00 | 4.17 | .08 | .13 | .09 | .27** | .23** | .27** | - |
| 8. STRS Dependency T2 | 164 | 2.04 (0.90) | 1.00 | 4.83 | -.02 | .09 | .08 | .29** | .34** | .25** | .57** |
| 9. STRS Dependency T3 | 153 | 1.92 (0.79) | 1.00 | 4.33 | -.01 | .08 | .06 | .33** | .31** | .37** | .49** |
| 10. SDQ Externalizing T1 | 172 | 0.86 (0.42) | .00 | 1.80 | -.25** | -.23** | -.20* | .52** | .53** | .51** | .22** |
| 11. SDQ Externalizing T2 | 165 | 0.78 (0.43) | .00 | 1.80 | -.10 | -.32** | -.26** | .52** | .70** | .63** | .23** |
| 12. SDQ Externalizing T3 | 153 | 0.71 (0.39) | .00 | 1.60 | -.10 | -.27** | -.32** | .37** | .53** | .57** | .15 |
| 13. SDQ Internalizing T1 | 172 | 0.29 (0.28) | .00 | 1.25 | -.21** | -.07 | -.01 | .26** | .26** | .20* | .44** |
| 14. SDQ Internalizing T2 | 165 | 0.30 (0.31) | .00 | 1.38 | -.09 | -.09 | -.03 | .34** | .39** | .30** | .39** |
| 15. SDQ Internalizing T3 | 153 | 0.24 (0.29) | .00 | 1.50 | -.20* | -.06 | -.13 | .21** | .28** | .34** | .42** |
| 16. SDQ Prosocial T1 | 171 | 1.00 (0.41) | .00 | 1.86 | .57** | .42** | .44** | -.44** | -.36** | -.35** | -.10 |
| 17. SDQ Prosocial T2 | 165 | 1.16 (0.49) | .00 | 2.00 | .45** | .50** | .53** | -.41** | -.49** | -.50** | -.15 |
| 18. SDQ Prosocial T3 | 153 | 1.21 (0.49) | .00 | 2.00 | .43** | .45** | .63** | -.31** | -.43** | -.56** | -.08 |

Table 1 (continued)

| | 8. | 9. | 10. | 11. | 12. | 13. | 14. | 15. | 16. | 17. |
|---|---|---|---|---|---|---|---|---|---|---|
| 1. STRS Closeness T1 | | | | | | | | | | |
| 2. STRS Closeness T2 | | | | | | | | | | |
| 3. STRS Closeness T3 | | | | | | | | | | |
| 4. STRS Conflict T1 | | | | | | | | | | |
| 5. STRS Conflict T2 | | | | | | | | | | |
| 6. STRS Conflict T3 | | | | | | | | | | |
| 7. STRS Dependency T1 | | | | | | | | | | |
| 8. STRS Dependency T2 | - | | | | | | | | | |
| 9. STRS Dependency T3 | .77** | - | | | | | | | | |
| 10. SDQ Externalizing T1 | .26** | .24** | - | | | | | | | |
| 11. SDQ Externalizing T2 | .33** | .31** | .70** | - | | | | | | |
| 12. SDQ Externalizing T3 | .25** | .29** | .71** | .79** | - | | | | | |
| 13. SDQ Internalizing T1 | .52** | .48** | .12 | .03 | -.06 | - | | | | |
| 14. SDQ Internalizing T2 | .61** | .59** | .23** | .30** | .19* | .58** | - | | | |
| 15. SDQ Internalizing T3 | .54** | .50** | .22** | .21** | .26** | .57** | .72** | - | | |
| 16. SDQ Prosocial T1 | -.15 | -.07 | -.51** | -.35** | -.32** | -.17* | -.16* | -.20* | - | |
| 17. SDQ Prosocial T2 | -.16* | -.15 | -.48** | -.55** | -.49** | -.21** | -.27** | -.29** | .70** | - |
| 18. SDQ Prosocial T3 | -.17* | -.18* | -.38** | -.45** | -.54** | -.16 | -.21* | -.38** | .55** | .73** |

*Note.* STRS = Dutch adaptation of the Student–Teacher Relationship Scale (Koomen et al. 2007); SDQ = Dutch translation of the Strengths and Difficulties Questionnaire (Van Widenfelt et al., 2003).

T1 = Time 1 (October to December 2010); T2 = Time 2 (December 2010 to March 2011); T3 = Time 3 (February to May 2011); Externalizing = Externalizing Behavior; Internalizing = Internalizing Behavior; Prosocial = Prosocial Behavior

*$p < .05$, **$p < .01$

Table 2.

*Standardized path coefficients from the covariate Condition (0 = control condition; 1 = intervention condition) to each of the variables in the cross-lagged models*

| | Model with Conflict | Model with Closeness | Model with Dependency |
|---|---|---|---|
| From Condition to: | β | β | β |
| Conflict T1 | .00 | - | - |
| Conflict T2 | .11* | - | - |
| Conflict T3 | .06 | - | - |
| Closeness T1 | - | .04 | - |
| Closeness T2 | - | -.09 | - |
| Closeness T3 | - | -.03 | - |
| Dependency T1 | - | - | -.05 |
| Dependency T2 | - | - | -.13* |
| Dependency T3 | - | - | .04 |
| Externalizing Behavior T1 | .07 | .07 | .07 |
| Externalizing Behavior T2 | .15** | .17** | .17** |
| Externalizing Behavior T3 | .12* | .11* | .12* |
| Internalizing Behavior T1 | -.08 | -.07 | -.08 |
| Internalizing Behavior T2 | -.05 | -.04 | -.05 |
| Internalizing Behavior T3 | .03 | .03 | .06 |
| Prosocial Behavior T1 | .04 | .04 | .04 |
| Prosocial Behavior T2 | -.05 | -.06 | -.06 |
| Prosocial Behavior T3 | .01 | .00 | -.02 |

*Note.* T1 = Time 1 (October to December 2010); T2 = Time 2 (December 2010 to March 2011); T3 = Time 3 (February to May 2011)

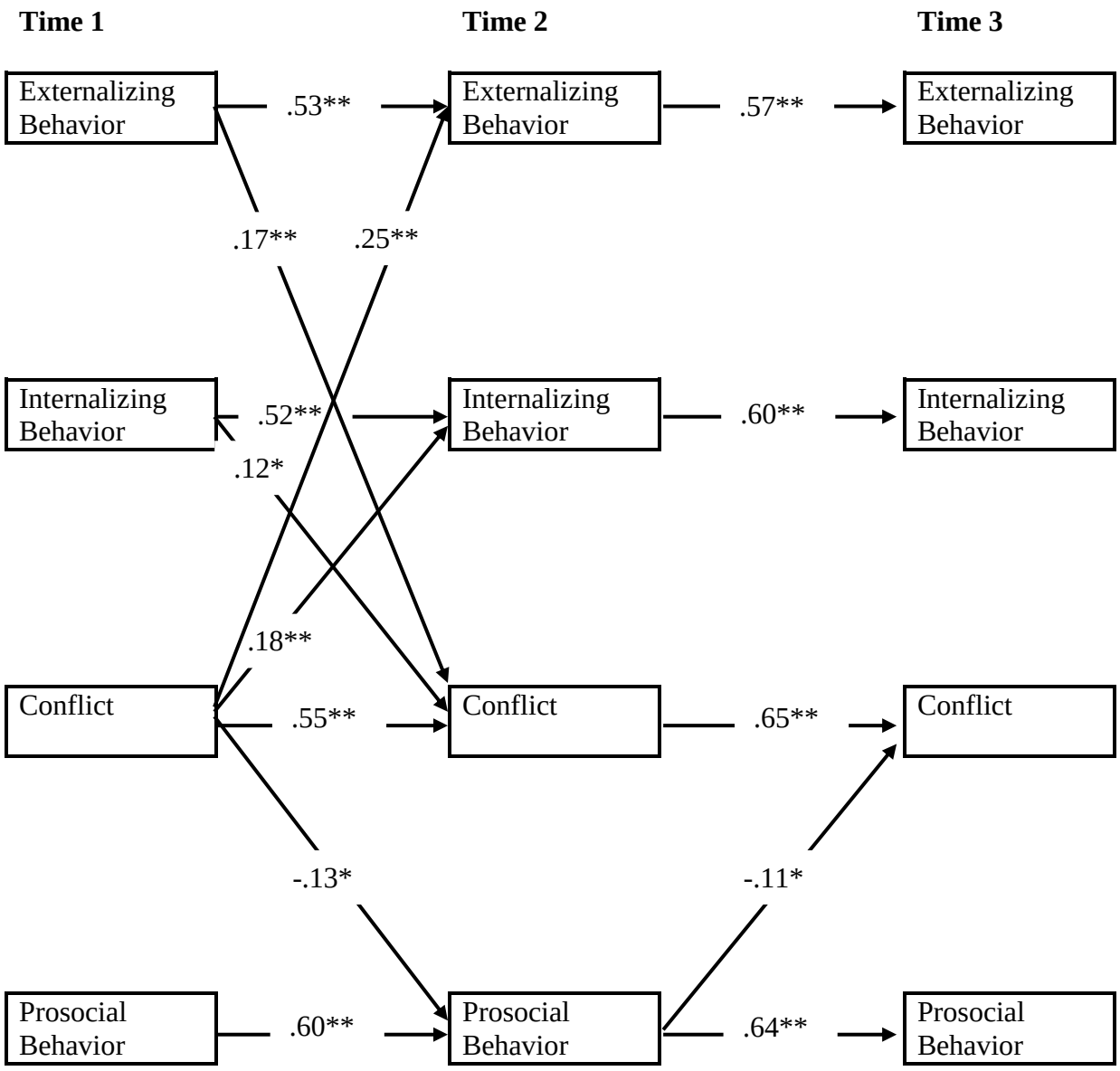
*$p < .05$, **$p < .01$

# Figure Captions

*Figure 1.* Final cross-lagged model displaying reciprocal associations between Conflict and children's behavioral adjustment at Time 1 (October to December 2010), Time 2 (December 2010 to March 2011), and Time 3 (February to May 2011). Nonsignificant path coefficients, within-time correlations, and paths from Time 1 to Time 3 were not presented for reasons of clarity. Path coefficients from condition are presented in Table 2. All path coefficients are standardized. *$p < .05$, **$p < .01$

*Figure 2.* Final cross-lagged model displaying reciprocal associations between Closeness and children's behavioral adjustment at Time 1 (October to December 2010), Time 2 (December 2010 to March 2011), and Time 3 (February to May 2011). Nonsignificant path coefficients, within-time correlations, and paths from Time 1 to Time 3 were not presented for reasons of clarity. Path coefficients from condition are presented in Table 2. All path coefficients are standardized. *$p < .05$, **$p < .01$

*Figure 3.* Final cross-lagged model displaying reciprocal associations between Dependency and children's behavioral adjustment at Time 1 (October to December 2010), Time 2 (December 2010 to March 2011), and Time 3 (February to May 2011). Nonsignificant path coefficients, within-time correlations, and paths from Time 1 to Time 3 from condition were not presented for reasons of clarity. Path coefficients from condition are presented in Table 2. All path coefficients are standardized. *$p < .05$, **$p < .01$


Time 1
Time 2
Time 3
Externalizing Behavior
Externalizing Behavior
Externalizing Behavior
.53**
.57**
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Internalizing Behavior
Internalizing Behavior
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.52**
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Conflict
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-.11*
Prosocial Behavior
Prosocial Behavior
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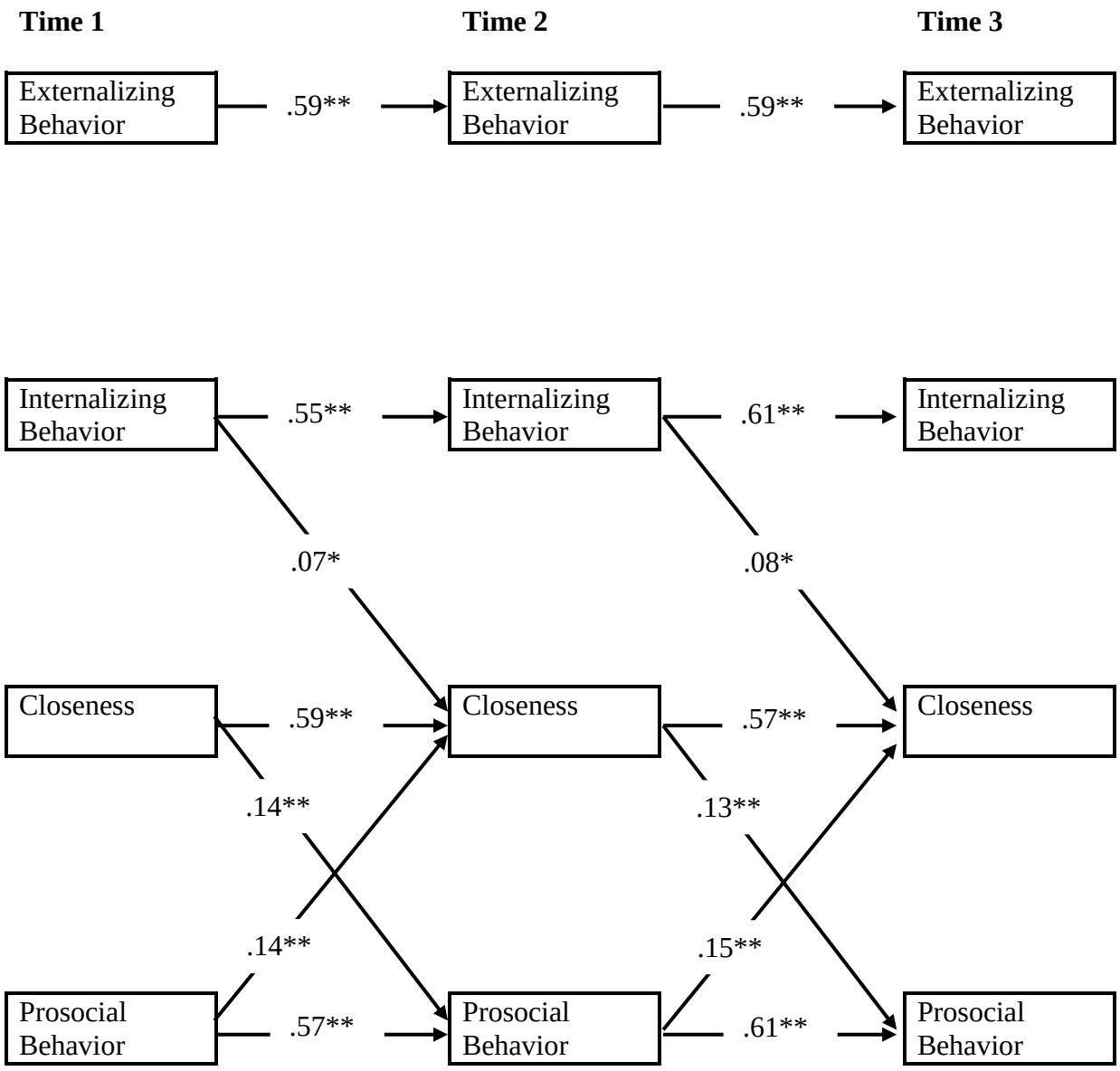
.64**

*Figure 1.*


Time 1
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Externalizing Behavior
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Closeness
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Prosocial Behavior
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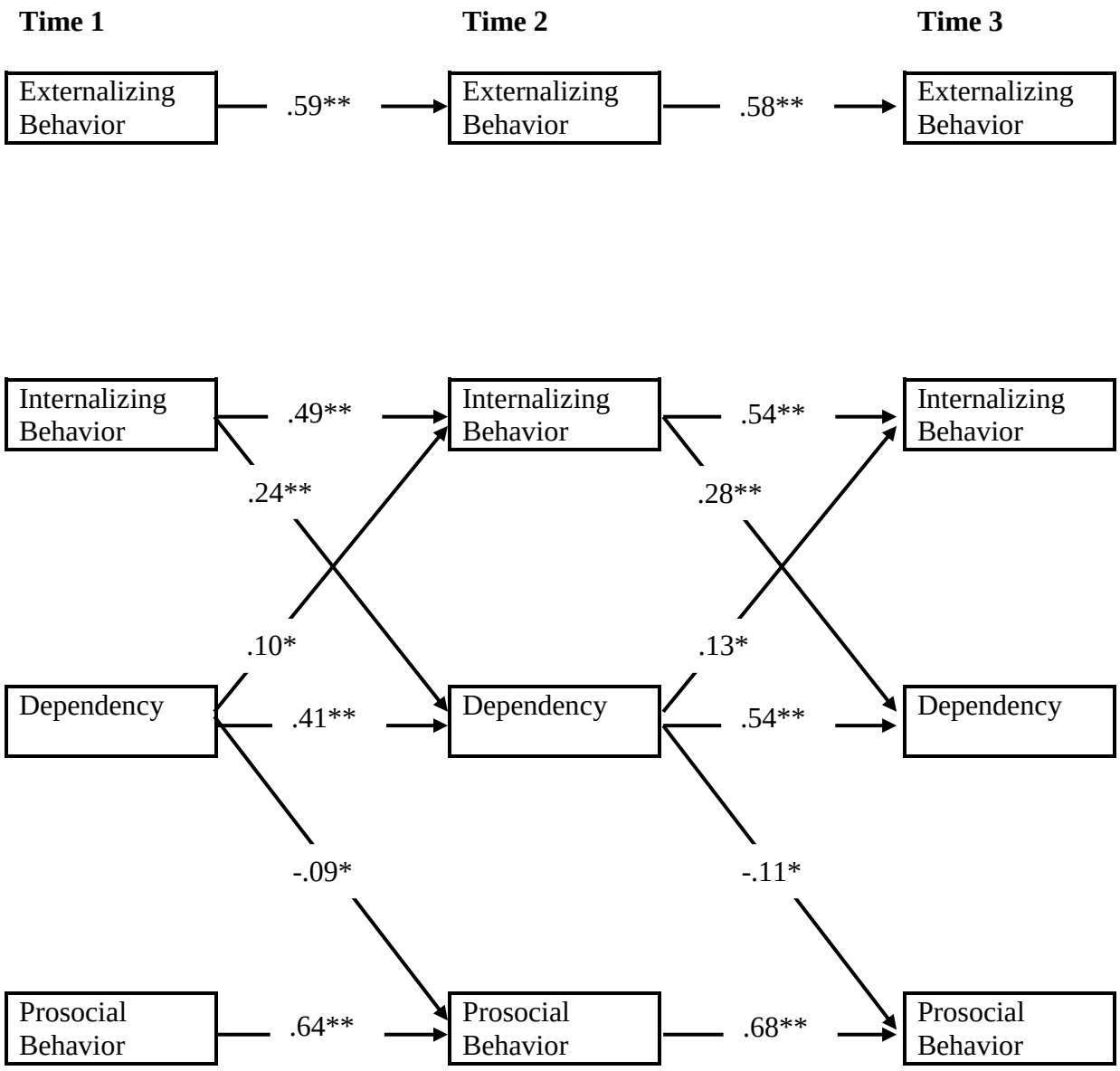
Prosocial Behavior

*Figure 2.*


Time 1
Time 2
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Externalizing Behavior
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Dependency
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Prosocial Behavior

*Figure 3.*